

**PROJECT NUMBER:** 1308  
**PROJECT TITLE:** Papermaking Process Development  
**PROJECT LEADER:** R. M. Rogers  
**PERIOD COVERED:** May 1990

## **I. LOW SIDESTREAM SMOKE PROJECT**

- A. **Objective:** Develop proprietary cigarette papers for low sidestream smoke.
- B. **Results:** Standard low sidestream models have been completed on 18 of 21 samples from a matrix of magnesium compounds produced using the sol-gel process. These fillers typically exhibit slow drainage characteristics and produce extremely tight sheets. A few of the fillers can be successfully incorporated in cigarette papers and exhibit sidestream smoke reductions up to 70% although a portion of this performance can be attributed to extended static burn times. Additional sheets are being produced to evaluate filler production repeatability and the subjective impact of these materials.

A number of approaches are being pursued to identify the physical attributes of the fillers produced from the sol-gel process that inhibit the successful production of papers. The water holding capacity of the fillers appears to be a significant factor influencing drainage on a paper machine. This can be determined by evaluating the filler's response to solids separation with a centrifuge. Under standard treatment, fillers that exhibit poor drainage characteristics invariably can not be concentrated to high solids levels (>15%). The rheology characteristics of the fillers should also reflect their water holding capacity. Both approaches are being used to identify fillers with satisfactory physical characteristics and to direct work in developing fillers.

- C. **Plans:** Develop a lab procedure to screen fillers for water retention characteristics and evaluate a select number of matrix samples (magnesium fillers from sol-gel process) in blends with calcium carbonate.

## **II. BANDED PAPERS (TOMORROW)**

- A. **Objective:** Incorporate cross directional bands of fiber and/or filler in cigarette papers in order to vary cigarette burn rate.

2022168901

- B. **Results:** The Daubing Dandy has been modified to improve water release properties and band contrast (water release coating, direct drive and additional vacuum inserts). Laboratory work is being conducted to develop a fiber slurry with the correct rheology/tack properties to improve contrast and reduce the add-on weight. A number of commercial modified cellulose materials are being investigated. Two viable materials, micro-crystalline cellulose (chemical modification) and SOLKA-FLOC (mechanical modification) are both currently being evaluated in combination with a binder (guar gum or highly refined cellulose). Micro-fibrillated cellulose and Cellulon (experimental material produced using bacteria) are also being evaluated. The next set of trials are scheduled at Maine for the first week in June.
- C. **Plans:** Complete laboratory evaluations of SOLKA-FLOC, micro-crystalline cellulose and micro-fibrillated cellulose.

Develop the capacity to apply bands with the Daubing Dandy at Maine (trials scheduled the first week in June).

### III. PROPRIETARY FILTER MATERIAL

- A. **Objective:** Develop a proprietary filter material in web form.
- B. **Results:** Trials were completed at Maine this month using 1/8" cut CA staple (75% CA + 25% refined softwood). This material substantially improved paper machine runnability versus 1/4" CA staple. Dispersion of the CA and CA/cellulose by passing the mixtures through a refiner further enhanced machine runnability and improved visual formation. Porosity variance was equivalent to previous runs at Maine. The sheets were also sized with a number of binders (CMC or PVA) to enhance tensile and elongation properties. Numerous attempts to crepe the web at both the second press and the last dryer of the first dryer section were unsuccessful. Since creping the sheet is not a viable alternative at Maine, elongation properties of the sheet produced at Maine will remain below 2%. Pending evaluation of the current run of CA/cellulose web produced at Maine (physical and subjective), additional sheets will be produced at various porosities with and without binders.

The proprietary position of this web is dependent on developing a product with unique properties since the inclusion of <70% cellulose acetate cut staple in paper webs is prior art. It may be possible to alter the filtration characteristics of the web by substituting another form of cellulose (such as straw) for softwood.

2022168902

Incorporating crepe in the CA/cellulose web and/or reducing cut staple denier may also provide a proprietary position. A number of these options will be evaluated in the lab and handmade filter plugs constructed to determine directional characteristics. If evaluations are encouraging, additional sheets can be produced at Maine. If creping is required, agreements with a vendor can be initiated to develop pilot quantities or possibly production quantities of this material.

- D. **Plans:** Produce and evaluate the physical properties of handsheets containing various levels of CA and types of cellulose fiber.

2022168903